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ASPECTS OF MATERNAL AND CHILD HEALTH STATUS IN MALUKU

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Introduction

Maluku Province (or the Moluccas) located in eastern Indonesia, is a vast archipelagic area comprised of more than a thousand islands straddling the Equator. With a population of about 1,850,000 people spread over an area the size of the States of Washington, Oregon, and California combined, but with only 10% as land mass, it is easy to appreciate some of the difficulties experienced by these people. Transportation and communication is a challenge second only to the task of providing adequate health and social services to the populace.[1]

This report provides the results and analysis of a health and immunization coverage survey conducted by Project Concern International/ Indonesia in the Province of Maluku, Indonesia, in November 1991.[2] The survey was conducted to derive baseline data in order to evaluate the maternal and child health situation for development planning and to determine targets for project objectives.

Methods

The Province of Maluku comprises 56 *kecamatan* (subdistricts) with a total population of 1,852,700. Due to the remoteness of a large proportion of the population, the province was arbitrarily divided into two separate stages for the implementation of activities. Area I, covering 32 *kecamatan* is considered easy to access; whereas Area II, with the remaining 24 *kecamatan* and about 28% of the population, is generally more remote and geographically more difficult to access.

The baseline survey sought information on immunization coverage for children, the tetanus toxoid (TT) immunization status of women during pregnancy, maternal prenatal and perinatal health care practices, Maternal Child Health services (*Posyandu*[3]), and knowledge and practice regarding the home management of childhood diarrhea.

For this survey the WHO cluster sampling method was used (Henderson & Sudaresan 1982, Expanded Program on Immunization 1991). The thirty clusters sampled were chosen randomly. The 30-cluster sample survey technique precludes the possibility of comparing one cluster or one group of clusters with another. It presents a composite summary (an average) for the 32 *kecamatan* surveyed.

This article analyzes the results of data collected from the Area I Baseline Survey that encompassed about three-quarters of the people (1,314,511) in the province. The data and results only represent the situation that exists in Area I. No conclusion can be drawn for Maluku Province as a whole from this data. A subsequent survey was conducted in Area II in September 1992. The results of this second survey and the calculated results for the entire province will follow in another paper.

The health situation in Area I is probably better than that in Area II since the latter area is recognized to have more problems with access to health services, governmental infrastructure, and communications. Thus, later inclusion of data from Area II is likely to "dilute" (worsen) these Area I results, providing a somewhat worse overall picture of the province.

Sampling

Using WHO methodology 2, it was determined necessary to interview eight mothers, each with a living child under two years of age in each of the thirty clusters. In order to determine the first household to be approached (the Starting Point), a location in front of the village assembly hall was chosen. Here, a member of the survey team spun a bottle in order to determine the direction in which the team initially proceeded. In order to select a specific house that lay in this direction, the last digit from the serial number of a randomly selected bank note was used. In cases where the clusters were in a large town or community that contained distinct neighborhoods, the above random selection method using a bank note was also used to select the relevant area in which to begin surveying.

If a household did not have a qualifying mother–child pair present, the survey team moved to the house whose front door was nearest the front door of the previous house, and so on, until eight mothers had been interviewed in that cluster.

EpiInfo Version 5.1, created by WHO and the Center for Disease Control in Atlanta, Georgia, was used to prepare the survey format, to analyze the data, to calculate the statistics, to cross-tabulate the results, and to produce the graphics. Our univariate analysis of the cross-tabulated data used the Mantel-Haenszel method to determine chi-square and p values.

The EpiInfo 5.1 computer program allowed ready analysis of immunization data. Aside from determining which children are completely immunized, the program permits the researcher to assess whether immunizations have been given at the proper time by readily converting dates to ages (in days, weeks, or months). Thus, it is feasible to determine not only which children are completely immunized, but also which children are completely and **correctly** immunized. The following criteria were used to ensure that the data collected in relation to immunization coverage was both correct and valid:

Complete immunization:

- Written proof of same, including date of immunization
- Having received BCG, DPT1–3, Polio1–3, and measles[4]

Complete and correct immunization:

- In accordance with the above criteria PLUS
- All immunizations received before 12 months of age
- Measles immunization received not earlier than 9 months of age

Traditional Birth Attendants

A significant proportion of this survey focused on the role of the traditional birth attendant (TBA). Consequently, it is important to clarify what this term means before proceeding further.

In a report on "Traditional Birth Attendants in Indonesia," van den Bosch (1986) provided the following definition of a TBA:

> the traditional midwife [TBA] is a ritual technical specialist in reproductive health. She is recruited, acquires training and practices within the context of a locally organized system of health beliefs and behavior,

> frequently functioning alongside the intrusive modern health care system. She is a member of the local community, knows its members personally, lives by its rules of proper comportment ... adheres to its values, and is subject to its sanctions.

She goes on to note that "the TBA's strength lies in her intimate relationship with her community. She is accessible, respected, and more finely suited for her work than perhaps anyone else. Her life is thoroughly intertwined with the lives of the women she serves; they hold a common body of beliefs, attitudes, values, language, and perspective." The TBAs, therefore, constitute an important component in the indigenous health care system in Indonesia. They play a vital medical, educational, and motivational role within their communities and are therefore essential to the success of this project.

Results and Discussion

Demography

A total of 240 mothers, each with a child under 24 months old were interviewed in the course of this survey. Table 1 presents demographic characteristics of the respondents in terms of the religion of the mother, and the gender and age of the child.

Table 1. Population demography

NO.	CATEGORY		TOTAL	PERCENTAGE
1.	Mother's religion	Christian	133	55
		Muslim	107	45
		TOTAL	240	100
2.	Child's gender	Male	115	48
		Female	125	52
		TOTAL	240	100
3.	Child's age	0–11 months	138	58
		12–23 months	102	42
		TOTAL	240	100

Only 7% (16) of the sampled mothers had not attended or completed school up to Grade 3. Of the remaining mothers (considered literate), half had finished primary school and the rest had gone beyond middle school. Moslem mothers were less likely to have finished elementary school ($\chi^2 = 3.86$, $P < 0.05$). Moslem mothers were more likely to be illiterate than Christian mothers ($\chi^2 = 9.33$, $P < 0.05$). In a chi-square analysis of literate versus illiterate mothers, there were no differences in the likelihood of their children being fully immunized, having had diarrhea in the previous two weeks, or receiving Oral Rehydration Solution (ORS)[5] for diarrhea; or of the mother having had a baby delivered by a formally trained health worker. In addition, there was no literacy correlation between the likelihood of the mother having two tetanus toxoid immunizations during pregnancy or having Oralit[6] in the home. Thus, illiteracy did not have an important influence on the health indicators measured in this survey.

Maternal Care and Knowledge

Many mothers were aware of the need for prenatal care, with most realizing the need for an exam during the first two trimesters; 103 respondents (43%) indicated that an expectant mother should visit a health specialist during the first three months of pregnancy, 71 (30%) indicated first attendance should occur between the fourth and sixth month, and 38 (16%) indicated that it should occur between the seventh and ninth month. However, 12% stated either that there was no need for an exam, or that they did not know when to seek care.

In addition, many women knew the importance of eating certain foods, with 59% (141) of respondents stating that they ate green leafy vegetables during their last pregnancy, and 11% (26) indicating that they ate food rich in protein during their last pregnancy (mentioning meat, fish, or eggs). But only one-third knew that it was necessary to eat more than the usual quantities of food during that time. In addition, there was little knowledge regarding the importance of weight gain during pregnancy, as 95% (218) of the respondents either did not know or were wrong when asked about the appropriate amount of weight gain (10–12 kg.).[7] It is likely that many rural women are not used to thinking in terms of weight gain (scales not always being available) as a significant sign, much less as a measure of adequate intrauterine growth.

Delivery Knowledge and Practice

Almost two-thirds (157) of the women surveyed used TBAs to deliver their children because the TBA usually lived nearer than the midwife at

the health center, and it was customary to use her services. Of TBAs who attended the births of these women, 59% (93) had received some training from the Ministry of Health (MOH). There were no differences in religion (Christian vs. Moslem) as to the tendency to use a TBA for delivery services, and both were just as likely to use a **trained** TBA. Fifty percent of the TBAs indicated that they used scissors to cut the umbilical cord and 49% (76) said that they used either alcohol, spirits, or iodine to dry it.

Trained TBAs were about six times more likely to use scissors to cut the cord than untrained TBAs ($\chi^2 = 33.3$; $P < 0.00001$) and more than four times more likely to use alcohol, methanol spirits, or iodine to dry the cord after cutting ($\chi^2 = 29.0$; $P < 0.00001$). This speaks well for the value of training TBAs. However, 44% (68) of the TBAs used traditional means (a sharpened bamboo or *gaba-gaba* sliver, unsterilized razor blade or knife) to cut the cord, and 40% (62) used traditional medicines (including ashes, vinegar, various leaves, hot coconut oil, and betelnut juice) to treat the cord. Perhaps this is a reflection of the need for improved training or interval refresher training. There was no correlation between a mother's religion and use of traditional medicine.

Also, trained TBAs received greater compensation (Rp10,000[8] or greater) for their services than untrained TBAs ($\chi^2 = 15.5$; $P < 0.0001$); only 10% (9) of trained TBAs received no payment as compared to 33% (12) of untrained TBAs. TBA training both benefited the health of mothers and children in the community, and also improved the economic status of the TBA. This strongly supports the value of TBA training for sustaining "Women in Development" activities.[9]

Women who were delivered by a TBA were less likely to have prenatal exams at a health facility due to the need to leave the village and break with local customs. However 95% (149) of the respondents who used the services of the TBA received some sort of postnatal care until the newborn's umbilical cord was dry or had detached. (These usually took the form of daily visits for a week to ten days).

Maternal Tetanus Toxoid Immunization

Only 19% (46) of the women interviewed were able to provide proof of tetanus toxoid (TT) immunization in the form of a Maternal Health Card (*Kartu Kesehatan Ibu*[10]) or from the clinic *Posyandu* records; of these, only 31 respondents (13%) had received the required number of

injections (at least two). This makes firm documentation of maternal immunization status difficult at best. Some mothers had received cards during their pregnancy at the time of prenatal exams or TT administration, but these had subsequently been lost or retained by the local health facility at the time of delivery. The use of the Maternal Health Card does not seem to be widespread as yet in Maluku. Because of the lack of cards, it is possible that the practice of giving TT at the *Posyandu* is therefore not as routine as with children, who almost always have a Road-to-Health Card (*KMS* or *Kartu Menuju Sehat*). This card is used to monitor a child's weight gain on a growth curve as well as to record immunizations and vitamin A supplements received by the child.

It is likely that some mothers received TT immunizations without having a recording made on a card. Information about immunizations administered and recorded in hospitals, private practices, or clinics could not be obtained in the scheme of this survey. Also there are mothers who received only one immunization during their last pregnancy but who are technically completely immunized because of having received two immunizations in a previous pregnancy. Complete immunization status cannot currently be assessed in either of the above situations by the Ministry of Health (MOH) or through the new Local Area Monitoring (*PWS* or *Pemanutuan Wilayah Setempat*[11]) program.

In order to gain as much information as possible, all respondents were asked how many times they could remember receiving injections in the shoulder during pregnancy.[12] A total of 94 (39%) respondents stated that they had received 2 or more during the last pregnancy. Thus, for now the best estimate of the TT immunization status of mothers ranges from those with proof (19%) providing a **minimal** estimate to those who give a history of receiving 2 or more injections in the shoulder (39%) (probably overestimating the rate) and producing a **maximal** estimate. Therefore, the true rate of coverage is probably between 19% and 39%.

Posyandu Activity

In Area I, where the population is better served and more developed, 87% of the communities have established *Posyandu*. Recently analyzed results indicate that only 50% of villages in Area II have *Posyandu*. The weighted average for the province is thus 73% (or about 1,220 villages).

Despite the fact that a large proportion of the surveyed population have access to *Posyandu*, only 56% (133) of the children under two

years old possessed a Road-to-Health Card (*KMS*). This may reflect several conditions:

(1) In Maluku there is a large transient/migratory population from Southeast Sulawesi who come to Maluku to do seasonal work picking cloves and nutmeg (Village Cooperation Unit Office 1991). Many of these people permanently reside in Maluku but, as "unofficial" transmigrants, are somewhat hesitant about receiving local government services, which would require registration. They tend to live on the edges of established population areas as "squatters."

(2) Urban mothers, being close to the established health facilities, often ignore the services of the *Posyandu* which may be stigmatized as a *"kampung"* or village-based health delivery program (Health Services Office 1991). They either get their immunizations at the local hospital or polyclinic (often without receiving a *KMS*) or simply neglect to appreciate immunizations as a necessity when there is such an array of curative services readily available.

(3) In the authors' experience there still are mothers who are simply not aware of the importance of the *Posyandu* in providing health services to their children and do not avail themselves of the program. This problem is being addressed by means of a "Social Marketing" approach.[13]

The Indonesian MOH recommends monthly visits to the *Posyandu* for all children below five years of age (Ministry of Health 1990), even after immunizations are complete, in order to monitor growth and receive other services like health education, Vitamin A, and Oralit for diarrhea management. However, this survey showed that, of the children who had verifiably visited a *Posyandu* (133 children with a *KMS*), only 25% had actually made a visit the previous month (October 1991). Oddly enough attendance for the five previous months (June–September) averaged 38%. The lower-than-average attendance during October is anomalous and may likely be explained by the fact that October is the peak of the spice harvest season, when many mothers are working outside the village picking cloves or nutmeg and have neither the time nor the means to visit a *Posyandu*.

Further analysis of *Posyandu* visits reveals a correlation with the age of the child (Table 2). Chi-square analysis confirms that there is a dramatic drop-off in visits, with children 12–23 months old only half as likely to have made a visit during the previous three months as children

under under 12 months olds ($\chi^2 = 10.3$; $P < .005$). This data supports the repeated field observations of the authors and project staff that immunizations serve as the strongest enticement to visit a *Posyandu*. Once a child is completely immunized, the mother is less likely to return, since growth monitoring and health education alone appear not to be as strong an attraction.

Table 2. *Posyandu* attendance as a function of age

AGE GROUP	NO.	NO. WITH *KMS*	PCT.	VISIT POSYANDU OCT. ONLY	VISIT CONSECUTIVELY AUG.–OCT.
0–11 mos.	138	78	57%	59% (46)	51% (40)
12–23 mos.	102	55	54%	27% (15) †	24% (13) ‡
TOTAL	240	133	56%		

† Rel. risk 2.16; $\chi^2 = 13.6$; $P < 0.001$
‡ Rel. risk 2.20; $\chi^2 = 10.3$; $P < 0.005$

Child Immunization Coverage

In this survey population, it was found that although 63% (64) of the children 12–23 months old had received all their immunizations, only 57% (58) received them before they were one year old. Effective coverage is further diminished if children are excluded who received their measles vaccine before 9 months of age (under 37 weeks) because vaccine administered before this time is considered ineffective at imparting lasting immunity to measles and probably should be repeated. This criterion brought the percentage of children completely and correctly immunized before the age of 12 months to 47%. **The 10% statistical limits of error of this 30-cluster sampling technique dictate that we can be 95% confident that the true coverage rate falls between 37% and 57% for the area surveyed.** The national target for Universal Child Immunization is set at 80% (Communicable Disease Control 1989).

In light of this result for the Area I population, and assuming that the Area II population (28% of the total) has a coverage rate of zero, the mean coverage rate for the whole Province of Maluku can be calculated as **no less than 34%**. The maximum rate would be no greater than 62%. These results correlate well with the immunization monitoring data col-

lected routinely each month by the Provincial MOH (Ristianto 1992). At the time of this survey Maluku had the lowest immunization coverage of all 27 provinces in Indonesia (UNICEF/EPI 1992).

Diarrheal Disease Management

In accordance with international convention (WHO 1989), data are gathered only from children who have had diarrhea in the previous two weeks in order to insure that information about treatment of diarrhea is as reliable as possible. Of all the respondents in this survey, 45 children (19%) had diarrhea during the previous two weeks (Table 3). This incidence is higher than expected, but is consistent with the dry season when water supplies are low and the prevalence of water-borne diseases is higher.

Table 3. Diarrheal treatment during the previous 2 weeks (N = 45)

TREATMENT	TOTAL	PERCENTAGE	
Nothing given	10	22%	
Antidiarrheals or antibiotics	11	24%	
Oralit	9	20%	**29%**
SSS †	4	9%	
Other fluids ‡	5	11%	
Rice water	1	2%	
Other §	6	16%	

† SSS = sugar-salt solution, a term referring to oral rehydration solutions prepared at home from sugar and table salt that approximate the WHO-recommended formulation found in Oralit.

‡ Includes tea and water

§ Includes local brews made with roots (in 2 cases) and unspecified leaves (in 4 cases).

The oral history of usage of ORS (Oralit or SSS) is relatively low (29%), but of greater concern is the great reliance on antidiarrheal medication and antibiotics (24%). These are medications that were administered by the mother at home before consultation at the health center or

hospital. In the case of antibiotics and prescription drugs, they were apparently unused medications from previous visits for members of the family. Nonprescription antidiarrheal drugs can be purchased over-the-counter at local drug stores or shops. It is apparent that a major community education effort is still needed regarding the use of ORS, along with warnings against the use of other medications for diarrhea in children. Another concern is the large number of women (22%) who gave no special treatment for the diarrhea at home. Some of these mothers live close enough to go directly to a facility to obtain ORS or definitive treatment. Oralit is distributed free of charge at the *Posyandu* and health centers. Packets may also be purchased at a local *warung* (neighborhood store). Only 14% of the families were found to have a packet of Oralit in the home at the time of interview.

Table 4. Diarrheal treatment histories for children *without* diarrhea during previous two weeks (N = 195)

TREATMENT	TOTAL	PERCENTAGE	
Nothing given	8	3%	
Antidiarrheals or antibiotics	8	4%	
Oralit	83	35%	**56%**
SSS	50	21%	
Other fluids †	28	14%	
Rice water	–	0%	
Other ‡	18	9%	
Did not remember	29	12%	

† Includes various preparations of strong, weak, or sweet tea (in 25 cases) or plain water (in 3 cases)

‡ Includes brews from leaves (in 12 cases), bark (in 1), nutmeg (in 1), betelnut (in 1), plant oil (in 1) and "black magic" (in 2).

Most mothers have heard of ORS from histories given by the 195 mothers whose children did not have diarrhea during the previous two weeks. In this case mothers were asked what initial home treatment they had given in the past, or what they would give if their child fell sick with

diarrhea (Table 4). These results are different from those mothers whose children had had diarrhea in the past two weeks, suggesting a difference in knowledge and actual practice. Thus, most mothers (56%) seemed to know about ORS, but only a fraction of these actually used it during the two weeks prior to the survey. Analysis showed no correlation between level of education and knowledge about or use of ORS.

Few mothers whose children had recently had diarrhea (22%) were aware of the need to increase breastfeeding, fluids, and food intake during diarrhea. Indeed, the sample is small (only 45 children had had diarrhea recently), so the potential for error is significant. However, when the same analysis is conducted on the 195 remaining mothers who were asked them what they would do **if** their child had diarrhea, the results are almost the same (that is, only 21%—41 out of 195—knew about the need to increase breastfeeding and the intake of fluids and food), suggesting the data given above is probably valid.

Given the low level of maternal knowledge about proper management of diarrhea at home, it was surprising to see that 40% (96) of the mothers knew at least one sign of dehydration (dry mouth, sunken eyes, decreased urination, decreased consciousness, malaise/weakness, or bloody stools[14]). When asked what signs or symptoms would prompt them to take their child with diarrhea to the clinic, many mothers (29%) responded with the answer "frequent" or "continuous" diarrhea. Since it is difficult to quantify how much is "frequent" and for how long it should be considered "continuous," this answer was not considered to indicate valid understanding of the danger signs suggesting referral to a health facility in the context of this survey.

CONCLUSION

The salient findings of this Area I Baseline Survey in Maluku can be summarized as follows:

1. Forty-seven percent (47%) of children 12–23 month olds had received all their immunizations correctly before 12 months of age.

2. Nineteen percent (19%) of the women who had delivered in the past 24 months had proof of complete tetanus toxoid immunization. This increased to 39% when verbal histories were obtained (without documentation).

3. Among the survey population, 56% of the children possessed Road-to-Health Cards (*KMS*). Of these, 22% had attended the *Posyandu* weighing session three consecutive times during the previous three months (August–September 1991).

4. Two-thirds of the births were assisted by a Traditional Birth Attendant (TBA)—59% of whom had been trained.

5. Among children who had had diarrhea in the previous two weeks, 29% had been given Oral Rehydration Solution (Oralit or SSS) at home. Only one-fifth (22%) of the mothers of these children knew how to properly administer fluids and food during treatment. However, 40% knew at least one danger sign of dehydration that signalled the need to take the child to a health facility. Oralit, the packaged ORS, was found to be available in only 14% of the households surveyed.

Neither religious affiliation nor literacy was correlated with the results. Trained TBAs were more likely to use scissors to cut the umbilical cord, less likely to use "traditional medicine" to treat it, and more likely to receive higher compensation for their services than untrained TBAs.

These results were used to adjust the objectives of this Child Survival VII project to reflect the reality of the baseline health status in Area I. Results of the Area II Survey (conducted in September 1992) are currently being compared to and combined with these results to achieve an overall province representation.

NOTES

1. This article is based on a paper presented at the Second International Maluku Research Conference, Honolulu, July–August 1992. The paper was based on research for the Phase I Baseline Survey in the Province of Maluku, Indonesia, a component of the Child Survival VII Project. This project was jointly implemented by The Ministry of Health, Province of Maluku, Indonesia, and Project Concern International/Indonesia, and received funding from USAID in Washington and UNICEF. The authors wish to thank Heather Lynch and Hellen Parera for their assistance in preparing this article.
2. Project Concern International (PCI) is a U.S.-based nonprofit, nondenominational, private voluntary organization (PVO) that provides assistance in health training and management to developing areas of the world. PCI/Indonesia (PCI/I) has been working in Indonesia since 1972. Consistent with the government of Indonesia's priorities in community health de-

velopment efforts in eastern Indonesia, PCI/I agreed to assist the health development efforts of Maluku Province. With the approval of and collaboration between the Kanwil/Dinas Health offices in Maluku and PCI/I, a health development project known as Child Survival VII (CSVII) has been implemented with funding from USAID in Washington and UNICEF.

3. The *Posyandu* (*Pos Pelayanan Terpadu*), or Integrated Health Service Post, is a community-based activity with technical support from the health center that serves communities monthly by providing immunizations, child weight and growth monitoring, nutrition education, prenatal care, family planning, and diarrhea control.
4. BCG (Bacille Calmette-Guérin) is a vaccine against tuberculosis. DPT is a combination of three vaccines against diphtheria, pertussis (whooping cough), and tetanus. Polio is the oral polio vaccine. The numbers after the vaccines denote the dose number, so that DPT2, for example, is the second DPT immunization.
5. ORS is a solution of salts and sugar formulated by the WHO for treatment of diarrheal disease. The powder sold in packets is mixed with water and given to patients with diarrhea to help prevent dehydration and promote faster recovery.
6. Oralit is the brand of ORS packet produced and distributed in Indonesia.
7. The standard defined and used by UNICEF/WHO for developing countries is lower than that for industrialized countries (UNICEF, WHO, & UNESCO 1990).
8. One dollar U.S. = Rp2,065 (as of February 1993).
9. "Women in Development" is a concept recently being promoted in international development programs to emphasize activities that will more likely benefit women.
10. The *Kartu Kesehatan Ibu* is a folded, cardboard record card distributed to pregnant mothers to record birth history, prenatal care visits, weight, and immunizations.
11. *PWS* is an immunization monitoring scheme developed jointly by UNICEF, the MOH, and the Dept. of Internal Affairs in early 1990. The health center immunizers are responsible for tallying the doses of vaccine given and for compiling a series of bar graphs comparing the achievements of different areas in realizing the national targets. It is intended as a management tool for delineating which areas (health centers or villages) need extra attention in the immunization program.

12. Several injections may be given pregnant women at the health center. Iron and vitamins are almost always given gluteally. Injections given in the deltoids of pregnant women who are not ill are almost certainly tetanus toxoid.
13. Social Marketing is the strategy of using standard "marketing" approaches to promote (or "sell") a change in social behavior. For instance, the social marketing of immunizations for children would entail the use of "advertising" to promote changes in community behavior wherein more people would seek immunization services.
14. Bloody stool is not a sign of dehydration, but suggests the child is suffering from a more serious intestinal infection due to *Salmonella*, *Shigella*, or amebic pathogens that may require treatment with antibiotics.

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